

60 × 60 × 76 mm San Ace 60L 9CRLB Type Long Life Counter Rotating Fan

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1. Introduction

With the development of an information society, communication devices such as ICT equipment and servers are increasingly essential in supporting our society and economy. As equipment performance rapidly advances, so does its density and the amount of heat generation. Amid such market trends, many customers are making use of counter rotating fans. In addition, equipment installed in critical facilities or remote locations requires high reliability and long life. For this reason, cooling fans are now required to offer extended service life and superior cooling performance.

We have offered the *San Ace 60L 9CRLA* type Long Life Counter Rotating Fan (hereinafter, “current product”). Now, in response to the above-mentioned latest market demands, we have developed and launched the *San Ace 60L 9CRLB* type Long Life Counter Rotating Fan (hereinafter, “new product”).

The new product features reduced power consumption and noise while maintaining a long life. It has also been certified under our own Eco Product standard, which recognizes products that help reduce environmental impact.

This article introduces the features and performance of the new product.



Fig. 1 60 × 60 × 76 mm *San Ace 60L 9CRLB* type

2. Product Features

Figure 1 shows the new product.

The new product achieves higher airflow and static pressure than the current product while maintaining a long service life.

3. Product Overview

3.1 Dimensions

Figure 2 shows the dimensions of the new product. It is designed to be compatible with the current product in dimensions and mounting.

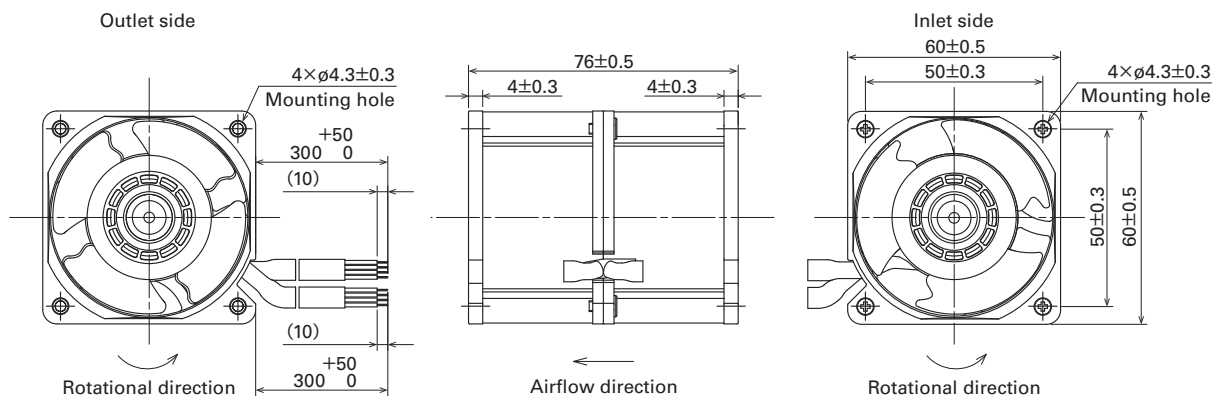


Fig. 2 Dimensions of 60 × 60 × 76 mm *San Ace 60L 9CRLB* type (Unit: mm)

Table 1 General specifications of 60 × 60 × 76 mm *San Ace 60L 9CRLB* type

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 life [h]
						Inlet side	Outlet side	[m ³ /min]	[CFM]	[Pa]	[inchH ₂ O]			
9CRLB0612POG001	12	10.8 to 13.2	100	3.6	43.2	19700	18300	2.4	84.8	1500	6.00	75	-20 to +70	100000 at 60°C (135000 at 40°C)
			20	0.28	3.36	5300	4800	0.64	22.6	110	0.44	43		

Note : PWM input frequency is 25 kHz. Speed is 0 min⁻¹ at 0% PWM duty cycle for models without ratings listed at 0%.
The speed when control terminal is open is the same as when the PWM duty cycle is 100%.

3.2 Specifications

3.2.1 General specifications

Table 1 shows the general specifications of the new product.

3.2.2 Airflow vs. static pressure characteristics

Figure 3 shows the airflow vs. static pressure characteristics of the new product.

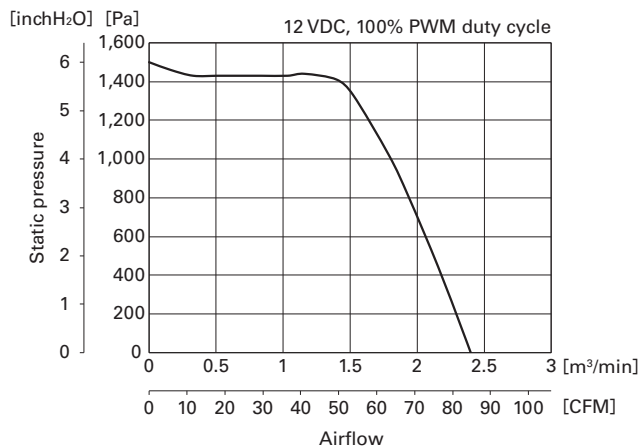


Fig. 3 Airflow vs. static pressure characteristics of the 60 × 60 × 76 mm *San Ace 60L 9CRLB* type

3.2.3 PWM control

The new product comes with PWM control for controlling fan speed.

3.3 Expected life

The new product has an expected life of 100,000 hours at 60°C (survival rate of 90%, run continuously at rated voltage and normal humidity in free air), which is the same as the current product while providing higher airflow and static pressure.

4. Key Points of Development

The new product achieves higher airflow and higher static pressure than the current product while maintaining a long service life. This is achieved through a highly efficient 3-phase drive motor, aerodynamically optimized impeller and frame shapes, and a downsized motor.

The key points of development are as follows.

4.1 Motor design

Achieving higher airflow and static pressure than the current product required a faster speed. Also, a longer service life can be achieved by increasing the efficiency and reducing the power consumption. An effective way to achieve this is to suppress the temperature rise in the bearings. One effective approach was to reduce power consumption by improving motor efficiency. To this end, the new product uses a 3-phase drive motor, which supports both high speed and high efficiency. The motor is small yet more efficient than that of the current product, contributing to low power consumption.

Figure 4 compares the motors of the current and new *San Ace 60L* fans. The current product uses a bipolar drive (single-phase full-wave) motor.



Fig. 4 Motors of the new and current products

4.2 Impeller and frame design

To achieve high airflow, high static pressure, and reduced power consumption, we adopted a 3-blade impeller for the inlet fan. Increasing the blade area leads to high airflow, while reducing the curvature of the blades lessens air load, contributing to reduced power consumption. Additionally, downsizing the motor allows for an increased inclination angle of the blade hub, further enhancing airflow. Simulations and actual equipment evaluations were carried out with various combinations. By optimizing the shapes of the rotor blades and frame spokes against the airflow, we achieved low power consumption and low noise under load. Figure 5 compares the shapes of the new and current rotor blades. Figure 6 shows an example of a simulation that visualizes the airflow.

The new product uses the same die-cast aluminum frame as the current product to ensure strength and effective heat dissipation, contributing to a long service life.

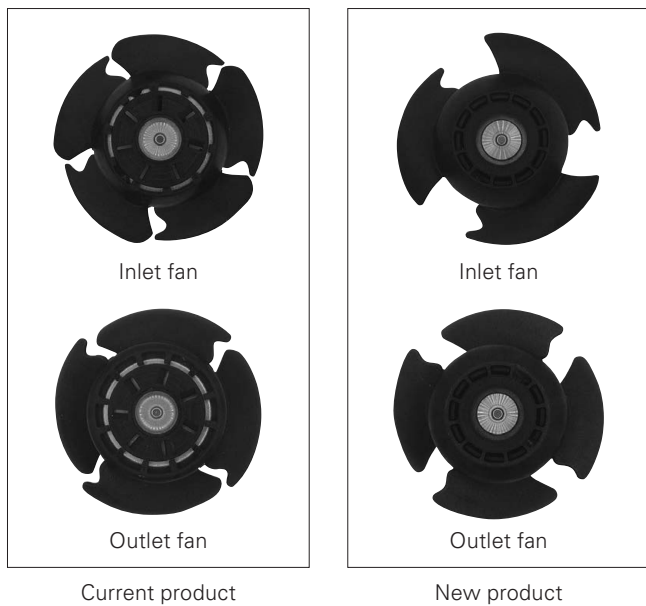


Fig. 5 Rotor blade shape comparison between the new and current products



Fig. 6 Simulation example (Airflow of the new product)

5. Comparison of New and Current Products

5.1 Comparison of airflow vs. static pressure characteristics

Figure 7 compares the airflow vs. static pressure characteristics of the new and current products.

Compared to the current product, the maximum airflow and maximum static pressure of the new product have improved by 15% and 7%, respectively.

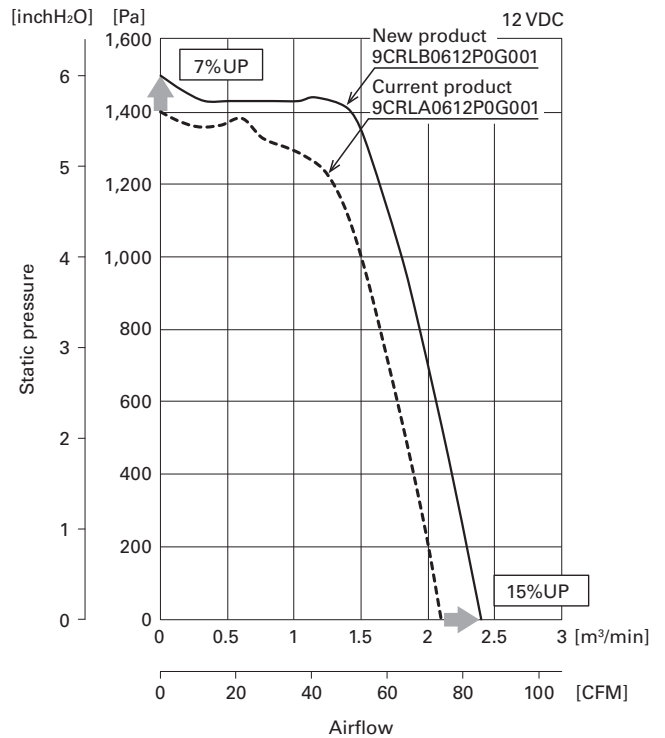


Fig. 7 Airflow vs. static pressure characteristics of the new and current products

5.2 Power consumption and noise comparison

Figure 8 compares the power consumption and noise level of the new and current products when operating with the same operating airflow.

At the estimated system impedance (equipment ventilation resistance) shown in the figure, the new product consumes 13% less power and produces 3 dB(A) less noise than the current product, demonstrating a higher efficiency and lower noise.

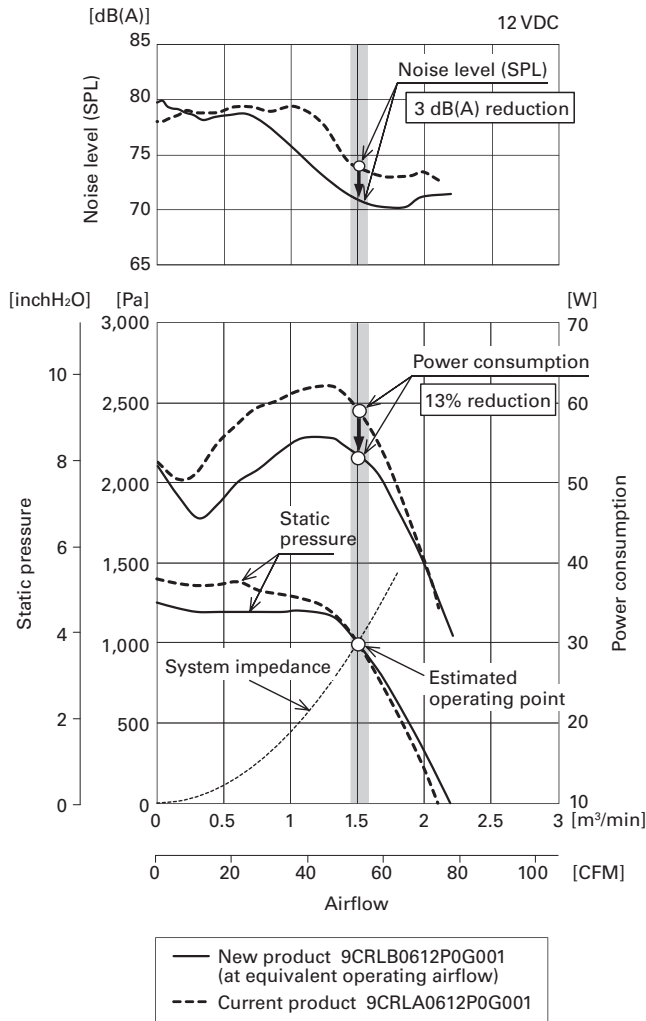


Fig. 8 Power consumption / Noise comparison between the new and current products

5.3 Environmental impact comparison

Figure 9 compares the CO₂ emissions of the new and current products over their life cycles.

Thanks to its greatly reduced power consumption, the new product emits 13% less CO₂ over its product life cycle compared to the current product. These improvements have qualified the new product for the Eco Products certification. Figure 10 shows the Eco Product symbol and logo.

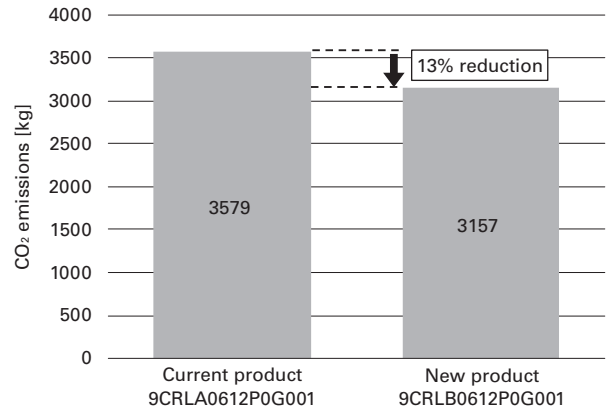


Fig. 9 CO₂ emissions comparison using our LCA calculation software (100,000 hours, when operating with the same operating airflow)



Fig. 10 Symbol and logo of Eco Products

6. Conclusion

This article introduced the features and performance of the *San Ace 60L 9CRLB* type Long Life Counter Rotating Fan.

The new product achieves higher airflow and static pressure than the current product while maintaining a long service life.

In addition, it achieves lower power consumption and lower noise under the same airflow. The product has been certified as an Eco Product due to the reduced environmental impact while maintaining the long service life of the current model.

We will continue to help our customers create new value by providing products that quickly address market demand.

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