

High Air Volume Fan “San Ace 80”

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1. Introduction

The 80mm sq. axial flow fan with a great demand in the information telecommunications equipment market is requested to obtain even higher air volume and static pressure because of increasing heating values and high densities of equipment.

We needed to design a new fan to achieve high air volume that satisfies customer demands though 32mm thickness is the biggest among our 80mm sq axis flow fans.

This time, we have developed an 80mm sq. x 38mm thickness fan, the “San Ace 80,” which has much higher air volume than previous fans while having extremely low noise.

This text is going to introduce its features.

2. Background of the Development

We have, so far, commercialized 4 kinds of BLDC fans, which are 15mm thickness, 20mm thickness, 25mm thickness and 32mm thickness. However, as I've already mentioned, there are some cases where these existing products cannot accommodate the latest growing demands for high air volume, low power consumption, or low noise. Thus, we have developed the “San Ace 80” G type series as a high air volume fan in the 80mm sq. series.

3. Features of the Developed Product

Fig. 1 shows the external view of the high air volume “San Ace 80”.



Fig. 1 High Air Volume “San Ace 80”

The features of the product are as follows:

- (1) High air volume - High static pressure
- (2) Low noise
- (3) Low power consumption

We developed a new blade and frame and improved the motor for this product. As a result, we achieved 1.7 times in maximum air volume and 2.3 times in maximum static pressure with this product (G speed : 2.55 m³/min, 211 Pa) compared to the product with the highest air volume among our existing 80mm sq. fans (80mm sq. x 32mm thickness, A speed : 1.52 m³/min, 91.1 Pa). This air volume vs. static pressure characteristic is equivalent to the 120mm sq. x 25mm thickness fan, which will contribute to the miniaturization of customers' devices.

As for the sound pressure level, 7dB(A) is reduced at the same air volume ratio to the conventional products.

4. Outline of the Product

4.1 Dimensions

Fig. 2 shows the dimension parameters of the developed product.

4.2 Characteristics

4.2.1 General Characteristics

The general characteristics of the developed product are shown in Fig. 1. Rated voltage is 12V, 24V and 48V; two kinds of rated rotation speed, G speed (6300min⁻¹) and H speed (5700min⁻¹), are commercialized.

4.2.2 Air Volume vs. Static Pressure

An example of air volume vs. static pressure of the developed product is shown in Fig. 3.

4.2.3 Life

The life of the developed product in an ambient temperature of 60°C (survival rate 90%, rated voltage continuous operation, free air condition, ordinary temperature) is 40,000 hours.

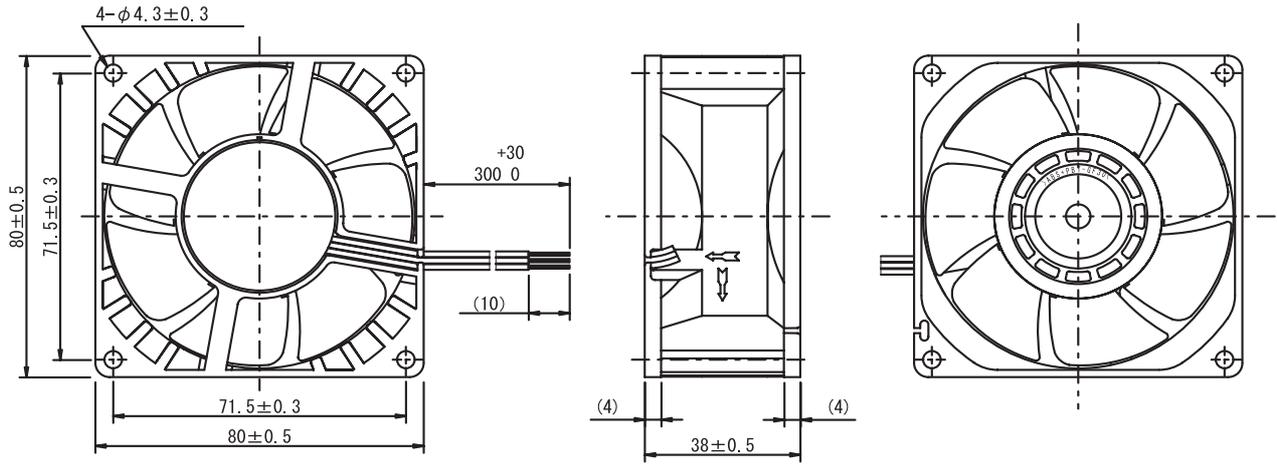


Fig. 2 Dimensions of the High Air Volume "San Ace 80" Series

Table 1 General Characteristics of the High Air Volume "San Ace 80" Series

| Model | Rated Voltage (V) | Operating Voltage Range (V) | Rated Current (A) | Rated Input (W) | Rated Rotation Speed (min^{-1}) | Maximum Air Volume (m^3/min) (CFM) | Maximum Static Pressure (Pa) | Sound Pressure Level (dB[A]) | Mass (g) |
|------------|-------------------|-----------------------------|-------------------|-----------------|--|--|------------------------------|------------------------------|----------|
| 9G0812G102 | 12 | 7~13.8 | 1.1 | 13.2 | 6300 | 2.55 | 90 | 51 | 170 |
| 9G0812H102 | | | 0.9 | 10.8 | 5700 | 2.28 | 80 | 49 | |
| 9G0824G102 | 24 | 20.4~27.6 | 0.56 | 13.4 | 6300 | 2.55 | 90 | 51 | |
| 9G0824H102 | | | 0.42 | 10.1 | 5700 | 2.28 | 80 | 49 | |
| 9G0848G102 | 48 | 40.8~55.2 | 0.27 | 13.0 | 6300 | 2.55 | 90 | 51 | |
| 9G0848H102 | | | 0.20 | 9.6 | 5700 | 2.28 | 80 | 49 | |

Air Volume vs. Static Pressure
(Measured with Sanyo Double Chamber)

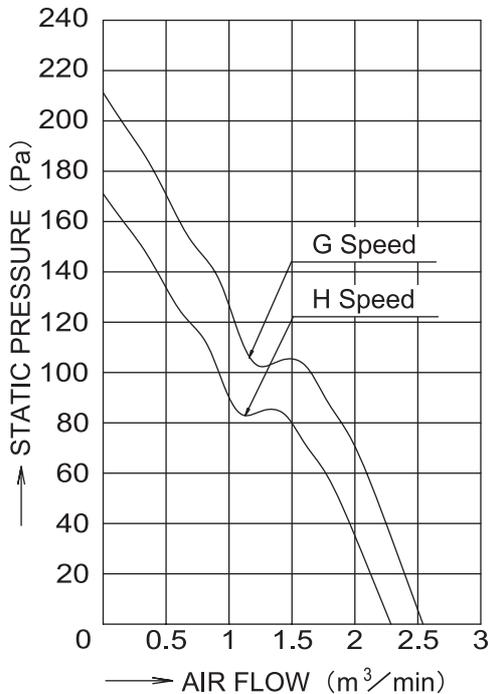


Fig.3 Air Volume vs. Static Pressure

5. Comparison with the Conventional Products

In the developed product, in addition to the increase of the maximum air volume and static pressure, and decreasing noise, we have achieved a great decrease of power consumption compared with conventional products.

We designed this product to raise the efficiency of each part while giving priority to the optimization of the blade and the frame. Redesigning the motor, improving the fluid efficiency of the blade and the frame shape, and giving the best load matched to the motor realized the optimization of the entire product.

The differences between the developed product and conventional products are introduced below.

Table 2 Comparison between the Conventional and Developed Product

| Model | Maximum Air Volume | | Maximum Static Pressure (Pa) | Sound Pressure Level (dB[A]) | Rated Input (W) | Mass (g) | Life (h /60°C) |
|--------------|-----------------------|-------|------------------------------|------------------------------|-----------------|----------|----------------|
| | (m ³ /min) | (CFM) | | | | | |
| 9G0812G101 | 2.55 | 90 | 211 | 51 | 13.2 | 170 | 40000 |
| 109P0812A201 | 1.52 | 54 | 91.1 | 45 | 6.72 | 150 | 40000 |
| 109P1212H401 | 2.5 | 88 | 53.9 | 40 | 5.4 | 210 | 40000 |

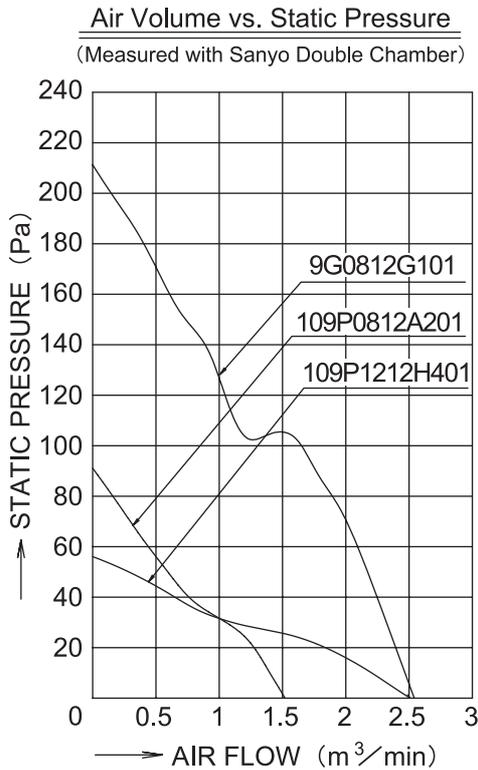


Fig.4 Comparison of Air Volume vs. Static Pressure

5.1 Comparison of Characteristics

Table 2 and Fig. 4 show concrete examples of comparisons of the characteristics with the conventional products.

The air volume performance of 1.7 times of maximum air volume and 2.3 times of maximum static pressure was achieved compared with the 109P0812A201 (80mm sq. x 32mm thickness), which has the most air volume among our conventional 80mm sq. fans. Moreover, not only is the air volume equal to our 109P1212H401 (120mm sq. x 25mm thickness) but the maximum static pressure reaches 3.9 times.

Fig. 5 shows the comparison on sound pressure level, power consumption, and miniaturization.

The sound pressure level has reduced 7dB(A) when assuming the developed product has the same air volume as the conventional 109P0812A201.

Power consumption is similarly decreased by 39% at the same air volume as 109P0812A201.

As for miniaturization, we consider down-sized from 120mm sq. x 25mm thickness to 80mm sq. x 38mm thickness, since the air volume performance is better than the 120mm sq. x 25mm thickness fan despite the size of the developed product, which is 80mm sq. x 38mm thickness. If we compare them by size, it is a 32% reduction.

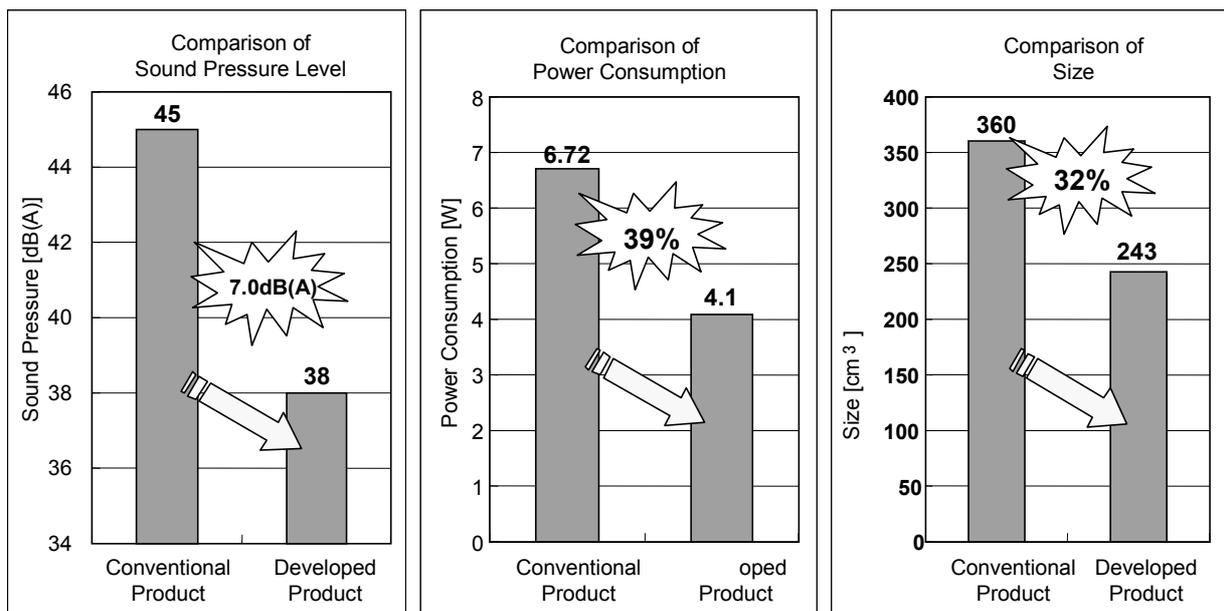


Fig. 5 Comparison

6. Conclusion

This text introduced the features of the 80mm sq. x 38mm thickness fan that has been developed to satisfy the demands for high air volume.

Features of the developed product are as follows:

1. The maximum air volume is 1.7 times and the maximum static pressure is 2.3 times larger than the fan with the largest air volume among our conventional 80mm sq. fans.
2. The sound pressure reduced 7dB(A) at the same air volume ratio to the conventional fan.
3. The air volume performance is greater than the H speed of 120mm sq. x 25mm thickness, which enables miniaturization of customers' device.
4. We will be able to propose a solution to customers who have trouble with insufficient cooling performance or loud noise.

This developed product can contribute to the miniaturization and noise reduction of future devices, such as information telecommunications equipment that will continuously be highly integrated and produce more heat.

From the viewpoint of contributing to the environmental preservation of earth as in the power saving and the performance improvement to the size and mass, this product is certified as an environmentally compatible design products (ECO PRODUCTS) of our company. (Fig. 6).



Fig. 6 ECO PRODUCTS trademark



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Joined company in 1978.
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