Large Air Flow and High Static Pressure “San Ace 36” GV Type

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1. Introduction

As information telecommunication equipment such as servers provide higher speed and performance while also achieving miniature size, the devices experience an increase in internal heat and density. Among these devices, there are many requests for 40 mm sq. or smaller sized fans that can be mounted in 1U servers. These devices must not only be small, but also contain large air flow and high static pressure.

Therefore, Sanyo Denki has developed a new 36 mm sq., 28 mm thick large air flow and high static pressure fan.

This document introduces the features and performance of the “San Ace 36” GV type fan.

2. Background of the Development

In recent years, internal areas of equipment are becoming higher heat and higher density, while at the same time the equipment is becoming smaller. In particular, the power supplies used on 1U servers are very small, so the fans used on the servers must also be miniature sized.

Furthermore, as the equipment becomes smaller, the internally mounted components are set closer to each other, so the system impedance (device load) for the equipment rises and the requests for fans with high static pressure increase. Our company has developed and sold both 40 mm sq. size and 38 mm sq. size fans in the past. However, there are cases where these current products cannot fit onto the devices or they cannot completely cool the component heat.

Therefore, our company designed a new miniature fan and developed the “San Ace 36” GV type as a new 36 mm sq., 28 mm thick large air flow and high static pressure fan to deal with these situations.

3. Product Features

Fig. 1 shows a photograph of the “San Ace 36” GV type fan.

The features of this product are as follows.

(1) Large air flow and high static pressure

(2) Miniature size

(3) PWM control function

(4) Best fit for miniature power supply of 1U servers (height 44.45 mm)

Fig. 1 “San Ace 36” GV type

The “San Ace 36” GV type (hereinafter referred to as “San Ace 36”) has achieved large air flow, high static pressure, and small size. Furthermore, the San Ace 36 can handle PWM control for the speed control function.

4. Product Overview

4.1 Dimensions

Fig. 2 shows the dimensions of the San Ace 36.

4.2 Characteristics

4.2.1 General characteristics

There are two types of products, each with a rated voltage of 12 VDC and a rated rotating speed of either J speed (19,000 min^{-1}) or G speed (14,000 min^{-1}).

Table 1 shows the general characteristics for the San Ace 36.

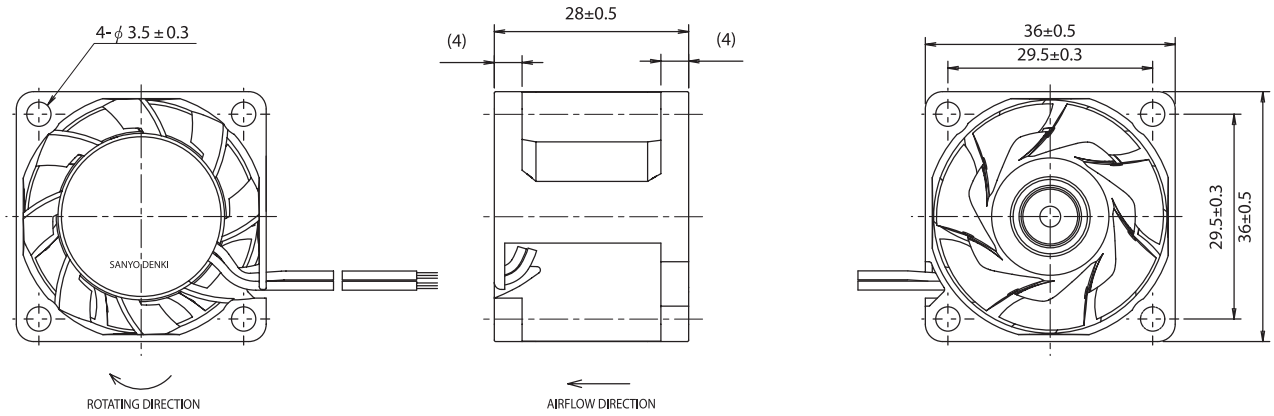


Fig. 2 "San Ace 36" GV type dimensions (unit: mm)

Table 1 "San Ace 36" GV type general characteristics

Model No.	Rated voltage (V)	Operating voltage range (V)	Rated current (A)	Rated power (W)	Rated speed (min^{-1})	Max. air flow (m^3/min)	(CFM)	Max. static pressure (Pa)	($inchH_2O$)	Sound pressure level (dB [A])
9GV3612J302	12	7.0～13.2	0.75	9.0	19,000	0.55	19.4	525	2.108	58.5
9GV3612G302			0.34	4.08	14,000	0.40	14.1	275	1.104	52.0

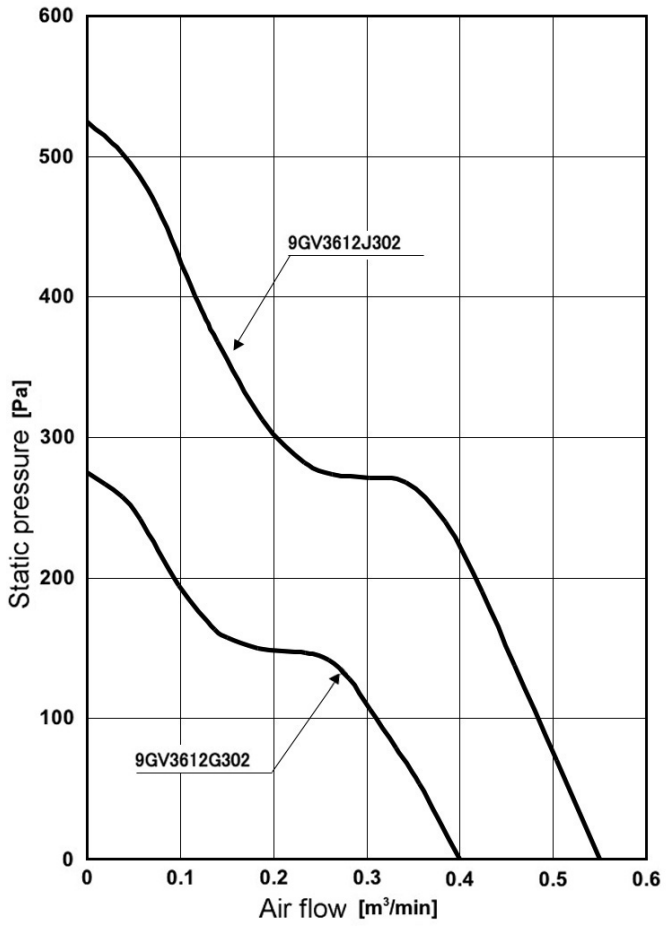


Fig. 3 Air Flow vs. Static Pressure

4.2.2 Air flow vs. Static pressure characteristics

Fig. 3 shows the air flow versus static pressure characteristics for San Ace 36.

4.3 Expected life

The San Ace 36 has an expected life 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 blade and the frame shape for the San Ace 36 were designed to improve the aerodynamic characteristics, thus providing large air flow and high static pressure while ensuring low noise.

The following information introduces the differences between the San Ace 36 and previously released products with similar sizes and highest performance: the 40 mm sq. size (9GV0412J302) and the 38 mm size (9GV0312J302).

5.1 High static pressure

Fig. 4 shows an example of air flow versus static pressure between the conventional high performance products and the San Ace 36.

For San Ace 36, 3D-CAD modeling and light model testing were used to pursue a blade and frame shape that produces optimal

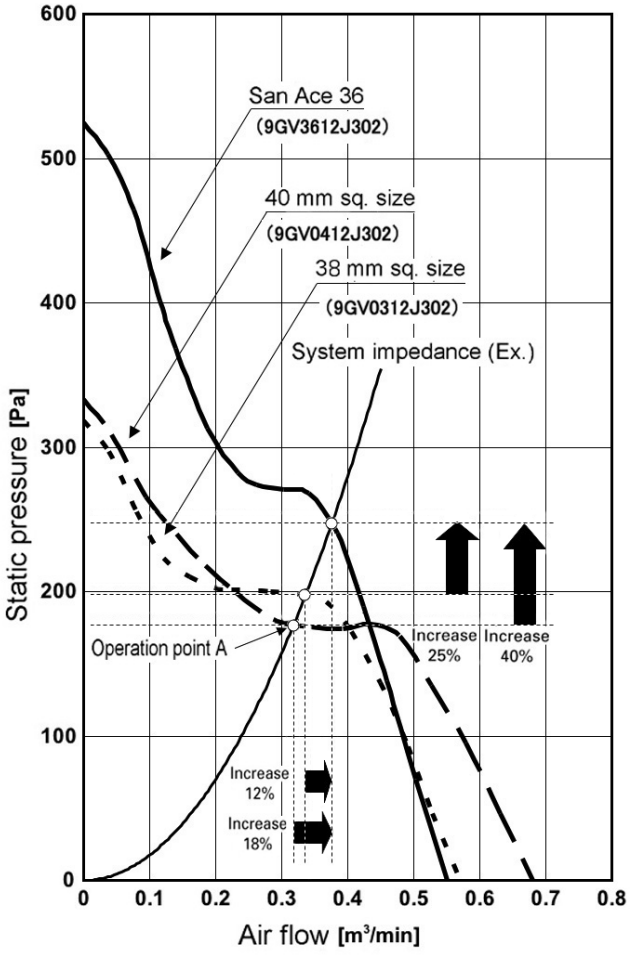


Fig. 4 Comparison of Air Flow vs. Static Pressure

aerodynamic characteristics. For example, assuming that the system impedance in the device is the same as shown in Fig. 4, the air flow is approximately 18% higher than the 40 mm sq. size unit (9GV0412J302) and approximately 12% higher than the 38 mm sq. size unit (9GV0312J302), and the static pressure is approximately 25% higher for both types. In other words, the cooling performance for high impedance equipment was improved to the next level. Furthermore, the maximum air flow is the same as for the conventional 38 mm sq. unit (9GV0312J302), but since the size is smaller, the San Ace 36 increases the static pressure over the conventional product to achieve high static pressure.

5.2 Low noise

For example, assuming that the system impedance in the device is the same as shown in Fig. 4, when the air flow versus static pressure for each fan passes through operation point A, Fig. 5 shows the results of sound pressure level comparison at operation point A.

San Ace 36 reduced the noise by 5 dB(A) compared to the conventional product 40 mm sq. size unit (9GV0412J302) and by 1 dB(A) compared to the conventional product 38 mm sq. size unit (9GV0312J302).

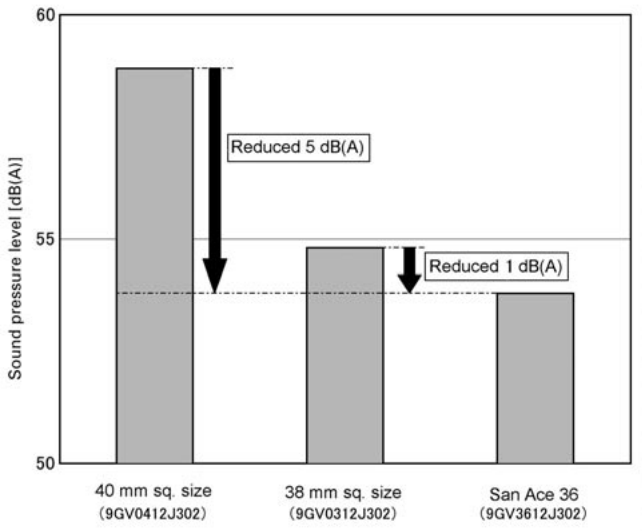


Fig. 5 Sound pressure level comparison at operation point A

5.3 Miniaturization

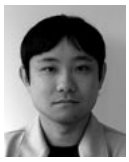
By reducing the size of the fan used on the customers' devices, the fan occupancy can be reduced within the device. In other words, by reducing the occupancy of the fan, other components can be mounted. Furthermore, by reducing the size of the fan, the wiring of the lead wires for the fan power supply in the device can be improved.

The San Ace 36 has approximately 19% lower volume and 8% less mass compared to the conventional 40 mm sq. size unit (9GV0412J302) and approximately 10% lower volume and 8% less mass compared to the conventional 38 mm sq. size unit (9GV0312J302) to achieve miniaturization and light-weight design.

6. Conclusion

This document introduces some of the features and abilities of the newly developed "San Ace 36" GV type fan.

This fan has improved performance compared to the Sanyo Denki conventional models (9GV0412J302, 9GV0312J302) with larger air flow, higher static pressure, and smaller size. This product is sure to contribute as a cooling fan for 1U servers, miniature power supply devices, and other equipment that features increased heat and higher density. Furthermore, this fan is also expected to provide a large contribution as other electronic equipment becomes smaller with higher performance.



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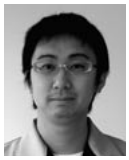

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