High Air Flow and High Static Pressure Blower "San Ace B97" BMB Type

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1. Introduction

Telecommunication and information processing equipment are becoming faster processing speed and more functional. At the same time, they had being packed more densely and are generating more heat. Thus cooling fans must have higher air flow and static pressure to cool the devices.

Therefore, Sanyo Denki has developed a new 97 mm sq. × 33 mm thick high air flow and high static pressure blower that has a significant improvement on all characteristics of the conventional model.

This document introduces the features and performances of the "San Ace B97" BMB type blower.

2. Background of the development

Computers and related devices frequently use 97 mm sq.×33 mm thick blowers. Sanyo Denki has developed and released the 9BAM series of blowers in this size. However, to keep up with the demand for speed and functionality of computing devices, the blowers installed on them must be also improved in performance. Additionally, just as devices featuring low power consumption are increasing for combat global warming, so are blowers that cool those devices. Our conventional model was not able to meet these demands in some circumstances.

Therefore, Sanyo Denki developed the "San Ace B97" BMB type as a new 97 mm sq.×33 mm thick, high air flow and high static pressure blower with cooling performance and energy requirements that are greater than the conventional model.

3. Product features

Fig. 1 shows a photograph of the "San Ace B97" BMB type blower.

The features of this product are as follows.

(1) High air flow and high static pressure
(2) Low power consumption
(3) PWM control function

The "San Ace B97" BMB type (referred to below as the new model), there is an increase of 18% in maximum air flow and 68% in maximum static pressure over its predecessor, which is the 97 mm sq.×33mm thick 9BAM blower. It also features the best low power consumption for its size. Additionally, the speed of the new model can be controlled though PWM controller.

Fig. 1: "San Ace B97" BMB type

4. Product overview

4.1 Dimensions

Fig. 2 shows the dimensions of the new model.

4.2 Characteristics

4.2.1 General characteristics

There are two types of products, each with a rated voltage of either DC 12 V or DC 24 V and K speed (6,850 min^{-1}).

Table 1 shows the general characteristics for the new model.

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

Fig. 4 shows the PWM duty cycle and speed characteristics of the new model.

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).

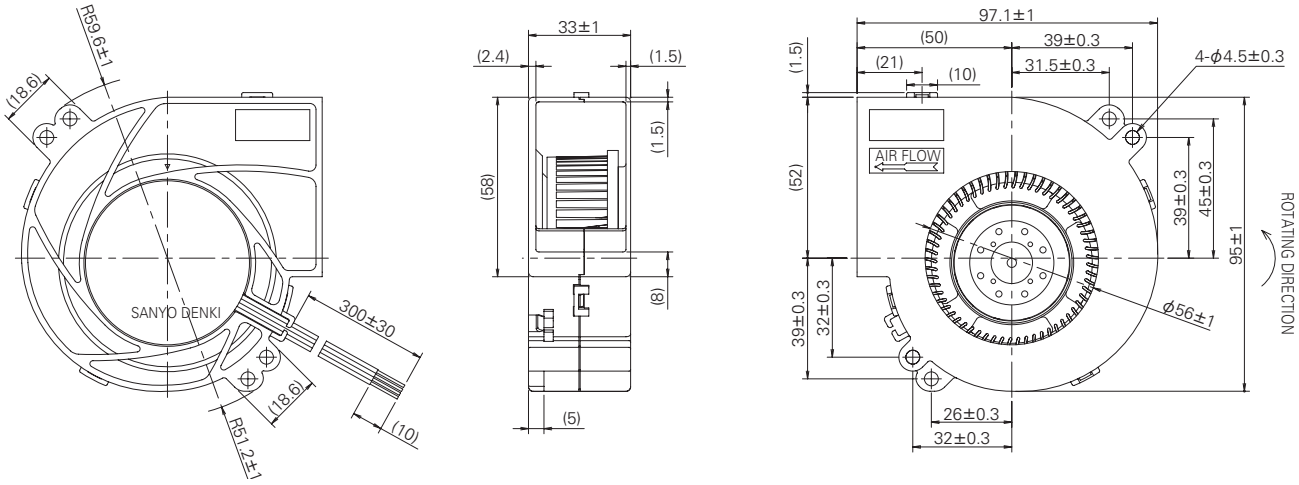

Fig. 2: “San Ace B97” BMB type dimensions (unit: mm)

Table 1: “San Ace B97” BMB type general characteristics

Model No.	Rated voltage [V]	Operating voltage [V]	Rated current [A]	Rated input [W]	Rated speed [min^{-1}]	Max. air flow [m^3/min]	Max. air flow [CFM]	Max. static pressure [Pa]	Max. static pressure [inchH_2O]	Sound pressure level [dB(A)]	Operating temperature [°C]	Life expectancy [h]
9BMB12P2K01	12	10.8 to 13.2	3.40	40.8	6,850	1.61	56.9	1280	5.141	66	-10 to +70	40,000
9BMB24P2K01	24	21.6 to 26.4	1.62	38.88								

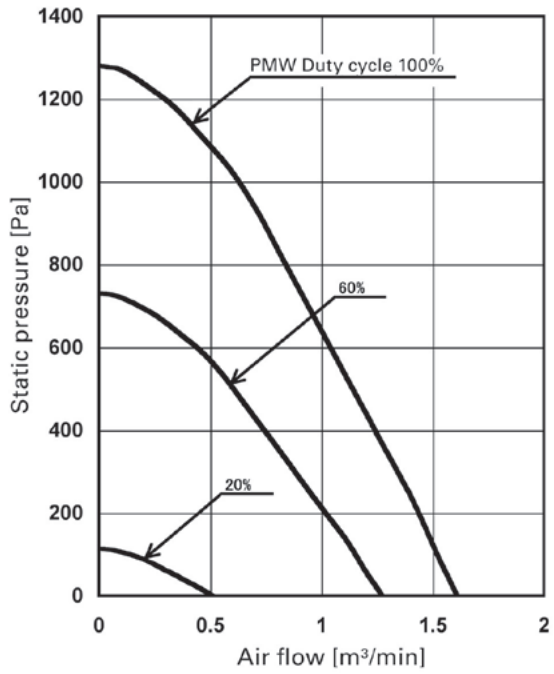

Fig. 3: 9BMB12P2K01 Air flow vs. static pressure

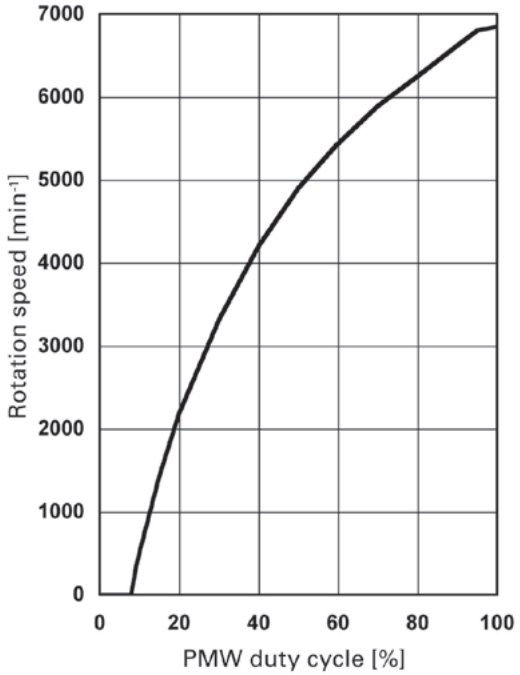

Fig. 4: 9BMB12P2K01
PWM duty cycle and speed characteristics

5. Comparisons with conventional models

The new model achieves improvements over the conventional model in all major characteristics through newly designed impeller, frame, and motor.

The standard way to increase air flow and static pressure of fans is to use a large motor and raise motor efficiency. However, the new model uses a higher efficient motor which has the same size as the conventional model (9BAM type). Using the same motor size allows considerably more design freedom for the impeller and frame, which excel in air flow, static pressure, power and sound pressure level.

The differences with the previous blower (9BAM type) of the same size are explained below.

5.1 High air flow and high static pressure

Fig. 5 shows an example of air flow versus static pressure between the conventional high performance products and the new model. Assuming the system impedance of a device shown in Fig. 5, the conventional model (9BAM12GC2) is at operating point A while the new model (9BMB12P2K01) is at operating point B with improvements of approximately 23% in air flow and 52% in static pressure. Additionally, the new model shows a 68% improvement in maximum static pressure, making it suitable for applications which are requiring high static pressure.

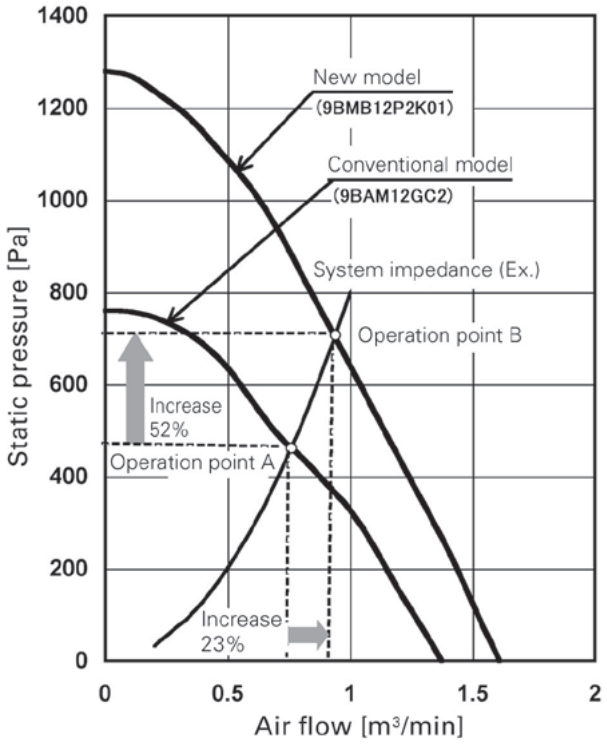

Fig. 5: Comparison of air flow and static pressure

5.2 Power consumption and SPL reduction

Fig. 6 shows a the air flow and static pressure characteristics of the San Ace B97 with its cooling power reduced to the same with the conventional model. Using the same system impedance as in section 5.1, both models were set to run at operating point A. As shown in Fig. 7, the San Ace B97 offers a 5% improvement in power consumption and 2.5 dB (A) reduction in sound pressure level.

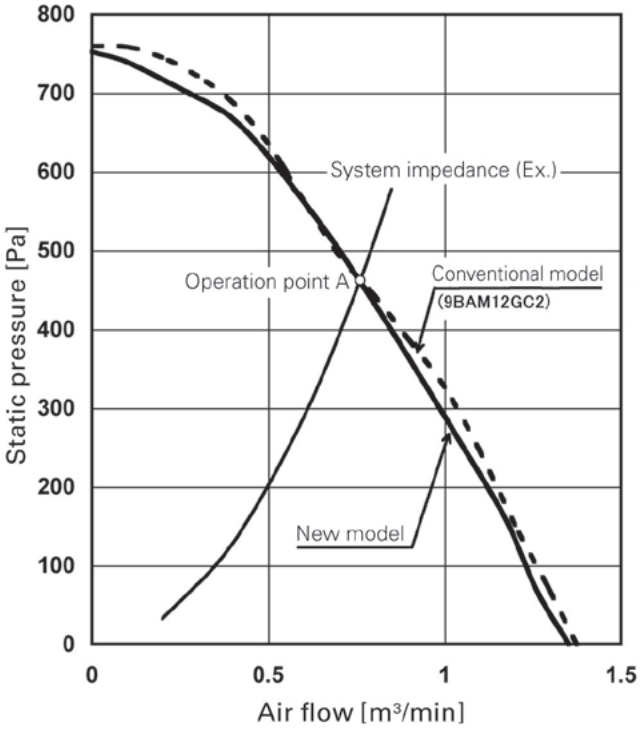

Fig. 6: Comparison of air flow and static pressure (Conventional and new model at same operation point)

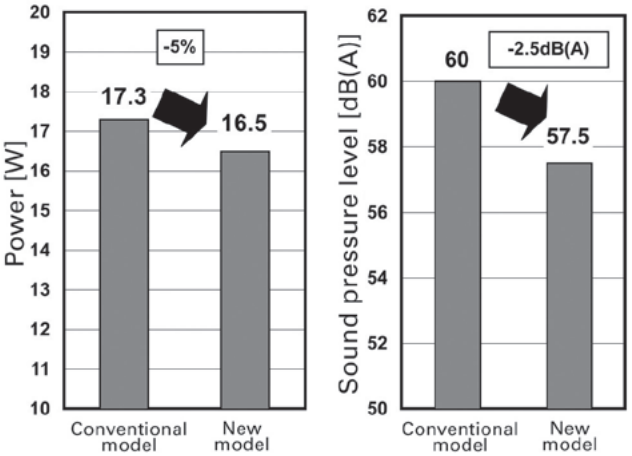

Fig. 7: Power consumption and sound pressure level comparison at operation point A

5.3 PWM control function

The new model offers reduced power consumption and sound pressure level during system standby. As shown in Fig. 4, fan stops at 0% PWM duty cycle. As for 9BMB12P2K01, power consumption at 100% duty is 40.8W the power can be down to 0.2W due to fan stops at 0% duty.

Additionally, conventional fan with PWM control took several seconds to start rotation after receiving a PWM signal, as shown Fig. 8. The new model is capable to start rotation immediately upon receiving a PWM signal, making it suitable for applications that require high responsiveness.

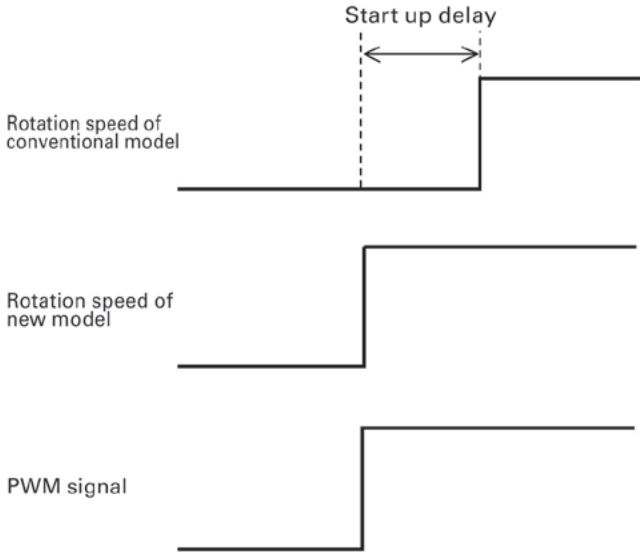

Fig. 8: Scheme of PWM strating signal

6. Conclusion

This document has introduced some of the features and characteristics of the newly developed “San Ace B97” BMB type.

The San Ace B97 offers a significant improvement in air flow and static pressure over its the conventional model (9BAM12GC2). Additionally, a top class PWM controller function improves the ease of use. The San Ace B97 blower is appropriate for cooling information-communications equipment, which generates much more heat and becomes more packed, and for applications which require high static pressure. Furthermore, this blower is also expected to provide a large contribution as the performance of other electronic equipment improves.

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