Low Power Consumption Fan "San Ace 60" GA Type

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1. Introduction

With the escalation in interest to the environment conservation, low power consumption products with low impact to environment are becoming the mainstream in various industries.

For the electronic equipment industry utilizing many cooling fans, low power consumption is required for the cooling fan since low power consumption is becoming one of the most important features of the product.

This document introduces the features and performance of the low power consumption "San Ace 60" GA type fan that was developed to meet these requirements.

2. Background of the development

The thin-type 60 mm square 15 mm thick fan is installed normally as the cooling device for the communication equipment and power supplies. Our "San Ace 60" P type was installed in those types of equipment. However, with the above mentioned requirement for low power consumption, and requirement for the low SPL in the home appliances has increased, there were many cases where conventional products could not meet the requirements.

To correspond with these requirements, "San Ace 60" GA type was newly developed.

3. Product features

Fig. 1 shows the appearance of the "San Ace C60" GA type.

The features of this new model are as follows:

(1) Low power consumption
(2) Low SPL
(3) PWM speed control function

The blade, frame, and motor were newly developed for the "San Ace 60" GA type (referred to below as the the new model) in order to achieve low power consumption and low SPL.

Fig. 1: "San Ace 60" GA type

4. Product overview

4.1 Dimensions

Fig. 2 shows the dimensions of the new model.

4.2 Characteristics

4.2.1 General characteristics

Two types of G speed (5,900 min^{-1}) and H speed (4,900 min^{-1}) were put in the market.

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 versus static pressure characteristics for the new model.

4.2.3 PWM control function

Fig. 4 shows the air flow versus static pressure characteristics at individual PWM duty regarding the new model (9GA0612P7G01).

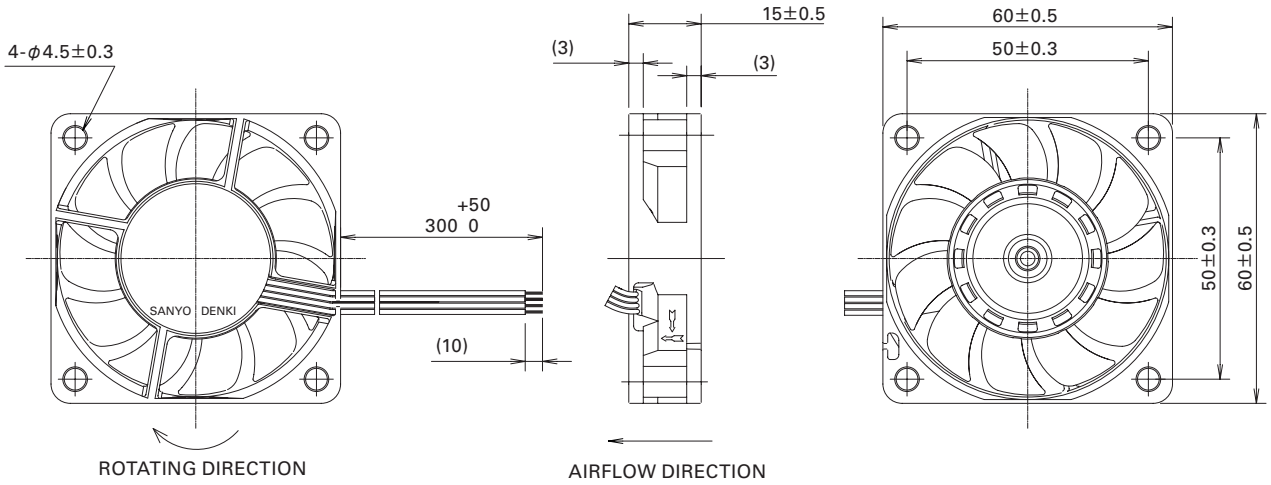

Fig. 2: "San Ace 60" GA type dimensions (unit: mm)

Table 1: "San Ace 60" GA type general characteristics

Model No.	Rated voltage [V]	Operating voltage [V]	PWM duty cycle [%]	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 [℃]
9GA0612P7G01	12	10.2 ～ 13.8	100	0.16	1.92	5,900	0.68	24	80	0.320	38	-10 ～ 70
			0	0.05	0.6	1,500	0.17	6.0	5.2	0.020	10	
9GA0612P7H01	12		100	0.10	1.2	4,900	0.56	19.7	55.6	0.223	34	
			0	0.03	0.36	1,300	0.15	5.3	3.9	0.015	8	

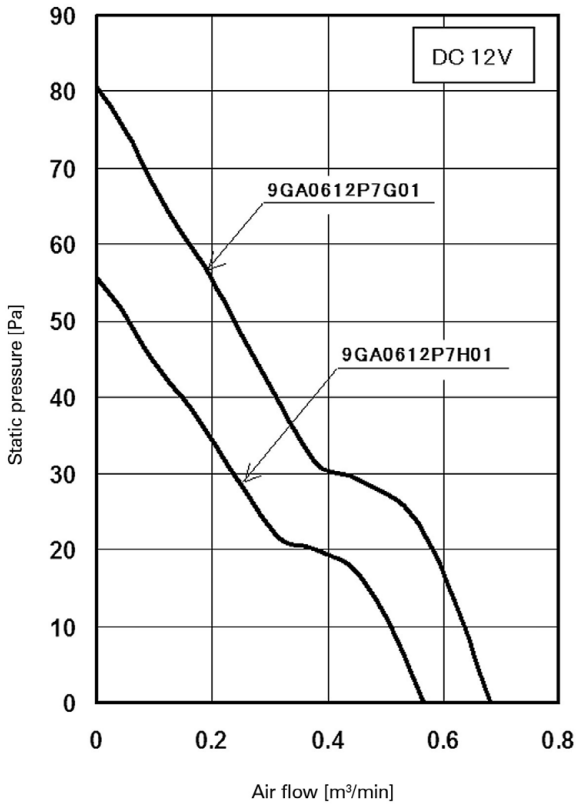

Fig. 3: Air flow vs. static pressure characteristics

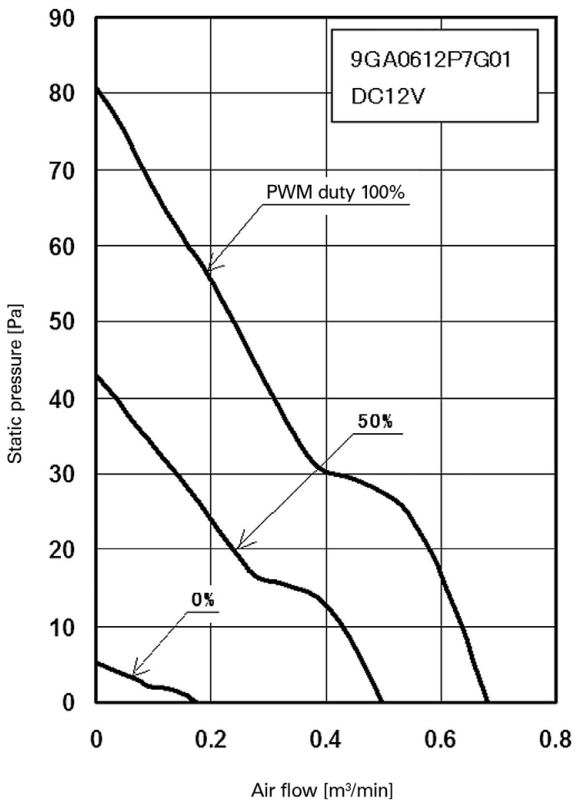

Fig. 4: Air flow vs. static pressure characteristics at individual PWM duty

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).

5. Comparisons with conventional models

A unique blade and frame that are efficient and quiet were newly developed for this new model. High efficiency was also realized in motor by optimizing stator core shape and other parts. As a result, a major reduction in power consumption and SPL were achieved.

5.1 Power consumption and sound pressure level

Fig. 5 shows the comparison of air flow versus static pressure characteristics between the new model (9GA0612P7G01) and the conventional model (109P0612K701). The new model has decreased 38% in power consumption and 5 dB (A) in sound pressure level compared with the conventional model at the same cooling performance with free air.

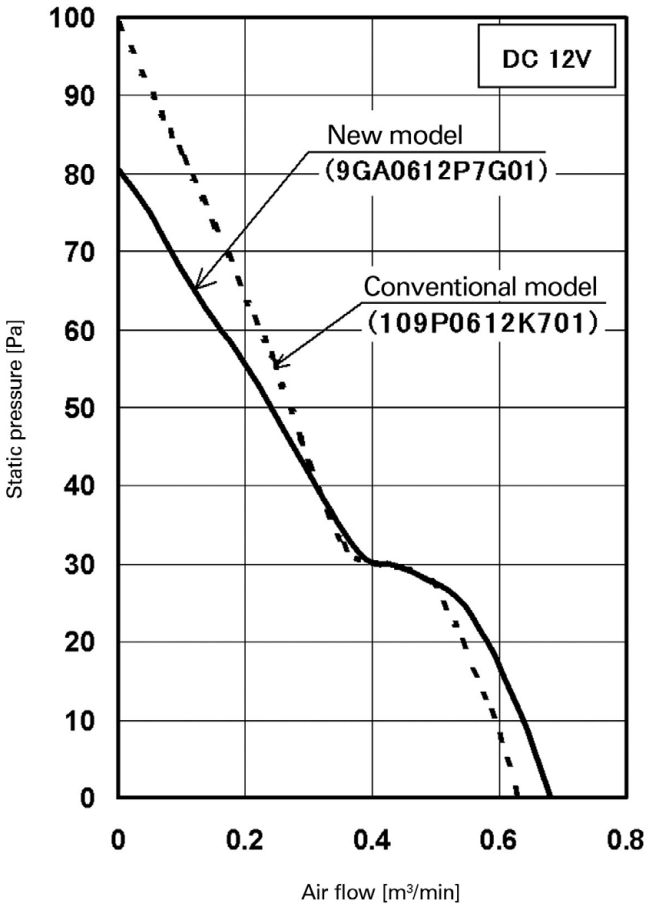

Fig. 5: Comparison of air flow vs. static pressure characteristics

Fig. 6 shows the power consumption comparison of the new model and the conventional model, and Fig. 7 shows the sound pressure level comparison.

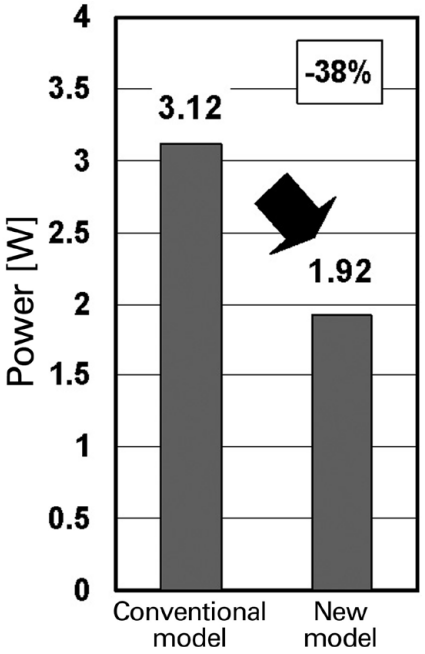

Fig. 6: Comparison of power consumption at free air

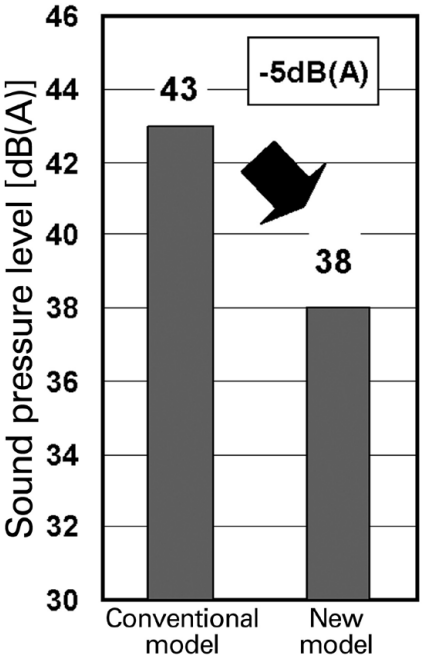

Fig. 7: Comparison of sound pressure level at free air

5.2 PWM control function

This new model has a PWM control function. Since the conventional model did not have this function, input voltage to the fan was changed to control the speed of the fan. This method can only control the speed in narrow

range, so there were cases where the required speed was not achieved.

PWM control is a function to control the speed of the fan in wide range by the PWM duty cycle input to the fan, and this makes it possible to adjust to a speed suitable for the required cooling performance.

As an example for 9GA0612P7G01, when the equipment is in an idle state and does not need to be cooled so much, it is possible to reduce the power consumption to 0.6 W and the sound pressure level to 10 dB (A) by inputting 0% as the duty cycle, making it possible for further low power consumption and SPL.

6. Conclusion

This document introduced some of the features and abilities of the newly developed low power consumption “San Ace 60” GA type fan.

This new model has achieved major reduction in power consumption and SPL, maintaining equal cooling performance as the conventional model, by the newly designed blades, frame, and motor. Also, this model has the top performance in the industry for 60 mm square 15 mm thick fans.

This new model is believed to contribute largely with the accelerating low power consumption of the electronic equipment and communication equipment.

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