SANYO DENKI TECHNICAL REPORT No.7 May-1999

Feature

"PETIT ACE 15" FAN (80mm sq.x15mm thick)

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1. Introduction

The development of ever more densely packed data processing equipment with higher performance and more compact designs in recent years has resulted in increasing heat generated inside personal computers and other electronic equipment.

The cooling fans used inside equipment are no exception from the requirements for smaller and thinner and higher performance such as a high air volume.

In addition, the intensified dissemination of equipment for office and home uses tends to make noise-reduction one of the more important requirements.

We have developed "PETIT ACE 15" BLDC fan in order to satisfy such requirements for a high air volume, low noise, and high reliability.

We will describe the outline and the advantages of the product in this section.

2. Background of Development

For our 80 mm sq. size BLDC fan, we have developed two sizes to date: 80 mm sq. x 20 mm thick and 80 mm sq. x 25 mm thick.

For the thin (15 mm) type fan series, BLDC fans have been developed in 40 mm sq. x 15 mm thick, 52 mm sq. x 15 mm thick, 60 mm sq. x 15 mm thick sizes and applied to various products.

The current sizes of our product line are sometimes not sufficient to meet all the existing demands now for thinness, high air volume, and low noise that we must accommodate.

We developed and released "PETIT ACE 15" BLDC fan which is 80 mm sq. x 15 mm thick as the high air volume model of our thin(15mm) type series of fans to fill the gap in our product line.

3. Advantages and Main Features of "PETIT ACE 15"

Fig. 1 below shows the outside view of "PETIT ACE 15."

Table 1 General features of "PETIT ACE 15"

Model No.	109P0812H702	109P0812M702	109P0824H702	109P0824M702
Rated voltage (V)	12		24	
Operating voltage range (V)	7 to 13.8		14 to 27.6	
Rated current (A)	0.2	0.09	0.1	0.05
Rated input (W)	2.4	1.08	2.4	1.2
Rated rotating speed (min^{-1})	3,100	2,000	3,100	2,000
Maximum air volume (m^3/min)	0.91	0.57	0.91	0.57
Maximum static pressure (Pa{mmH_2O})	29.4{3}	12.6{1.29}	29.4{3}	12.6{1.29}
Noise* (dB[A])	31	21	31	21
Mass (g)	68			

* At 1m from the intake surface of the fan

"PETIT ACE 15" series of fans have been developed based on the existing 15 mm thick fans by redesigning vanes and frames for a high air volume, high static pressure, and low noise.

The advantages of this fan are as listed below:

(1)Thin

(2)High air volume and high static pressure

(3)Low noise

(4)High reliability

3.1 Dimensions

The dimensions of "PETIT ACE 15" are indicated in Fig. 2.

3.2 General Features

The general features of "PETIT ACE 15" are as shown in Table 1. Actual products have been developed as specified with the rated voltages of 12V and 24V and the rated rotating speed of H (high)-speed (3100 min^{-1}) and M (medium)-speed (2000 min^{-1}).

3.3 Air volume Versus Static Pressure

Fig. 3 shows the example of air volume versus static pressure of the H-Speed product (at the rated rotating speed of 3100 min^{-1}) and M-Speed product (at the rated rotating speed of 2000 min^{-1}) of "PETIT ACE 15." The air volume versus static pressure of our 80 mm sq. x 20 mm thick H-speed fan (at the rated rotating speed of 2900 min^{-1}) which has the same noise value is also shown for comparison purposes.

Although "PETIT ACE 15" is very thin (15 mm), it has air volume versus static pressure which exceeds that of 20 mm thick fans with 8.3% more air volume and the same level of static pressure.

3.4 Loaded Noise Characteristics

Fig. 4 displays the measuring method of loaded noise, while Fig. 5 indicates the relationship between noise and air volume versus static pressure of "PETIT ACE 15" by providing an example of air volume versus static pressure versus noise.

Loaded noise is the noise level of a fan placed under a static pressure load. The noise level normally shown in a catalog is the noise level of a fan suspended in the air without any load, which is not the same as the noise level of an actually mounted fan. The noise level of a fan actually mounted in a device is the noise level measured at a working point of the air volume versus static pressure which is determined by the pressure loss of the device.

Fig. 5 shows that the noise from "PETIT ACE 15" is the lowest when the pressure loss of the mounted device is 12Pa or lower.

3.5 Structure

"PETIT ACE 15" structural diagram is shown in Fig. 6.

"PETIT ACE 15" uses a 2 phase 4 pole brushless motor.

Despite its thin (15 mm) construction, it has two ball bearings (outer diameter 8 mm , inner diameter 3 mm and 4 mm wide) similar in size to the bearings used in Sanyo Denki's 120 mm sq. fan.

The bearing housing is made of brass given the dimensional accurasy and heat dissipation that influence the life of the motor.

Thus "PETIT ACE 15" is ensured of an expected life of 40,000 hours at the ambient temperature of 60 ° C with a survival rate of 90%.

The fan is a high reliability shock resistance of 294m/s^2 , or 30G, (sweep time: 11 msec).

4. Conclusion

This concludes our description of some of the important aspects of the newly developed "PETIT ACE 15."

It is expected that personal computers and various other electronic equipment will become increasingly smaller and more densely constructed, raising the heat value even more.

We are confident that "PETIT ACE 15" can greatly contribute to enhance cooling possibilities for electronic devices with its outstanding characteristics such as thin

structure, high air volume, low noise, high reliability, and long expected life under demanding conditions.

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fig. 1 Outside view of "PETIT ACE 15"

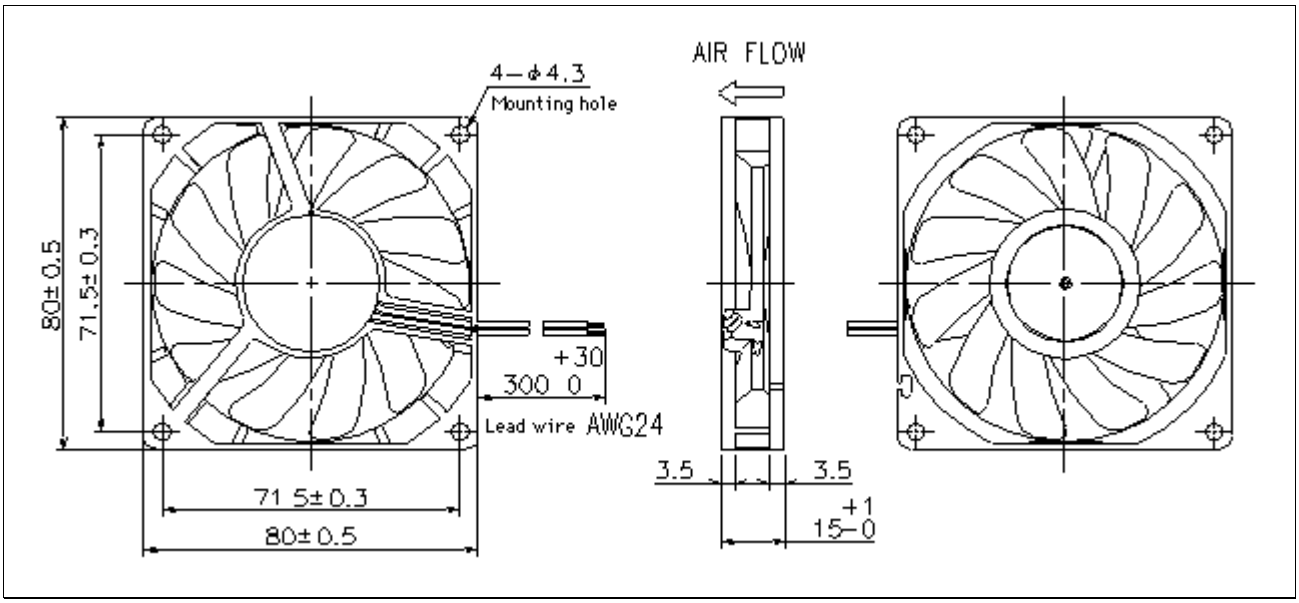

fig. 2 Dimensions of "PETIT ACE 15"

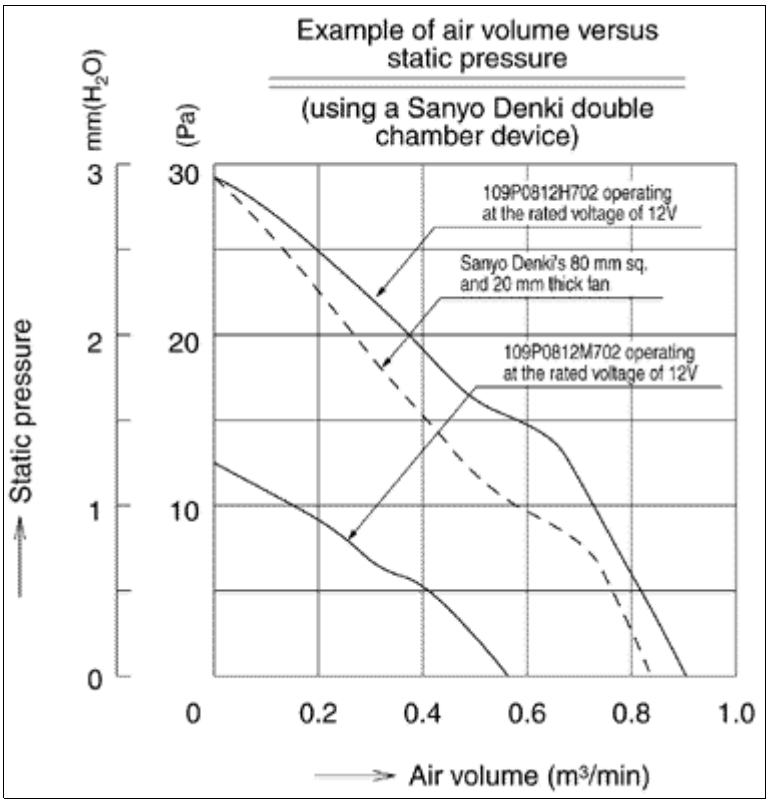

fig. 3 Examples of air volume versus static pressure for "PETIT ACE15"

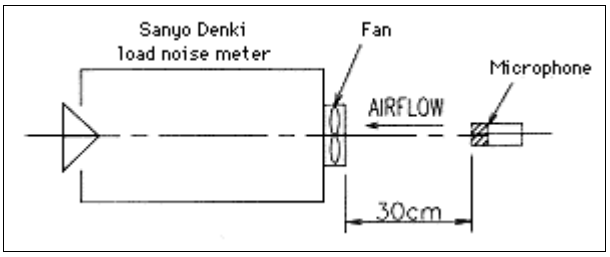

fig. 4 Measuring method of a load noise measurement equipment

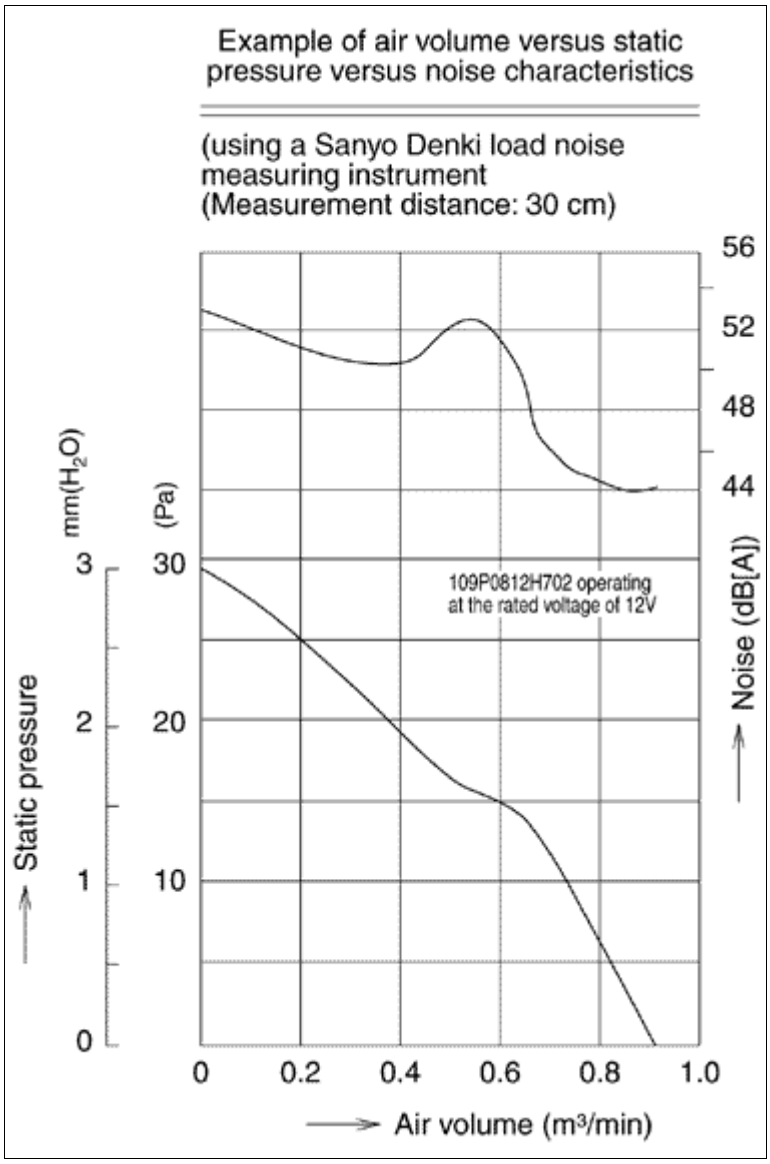

fig. 5 Examples of air volume versus static pressure versus noise characteristics of "PETIT ACE15"

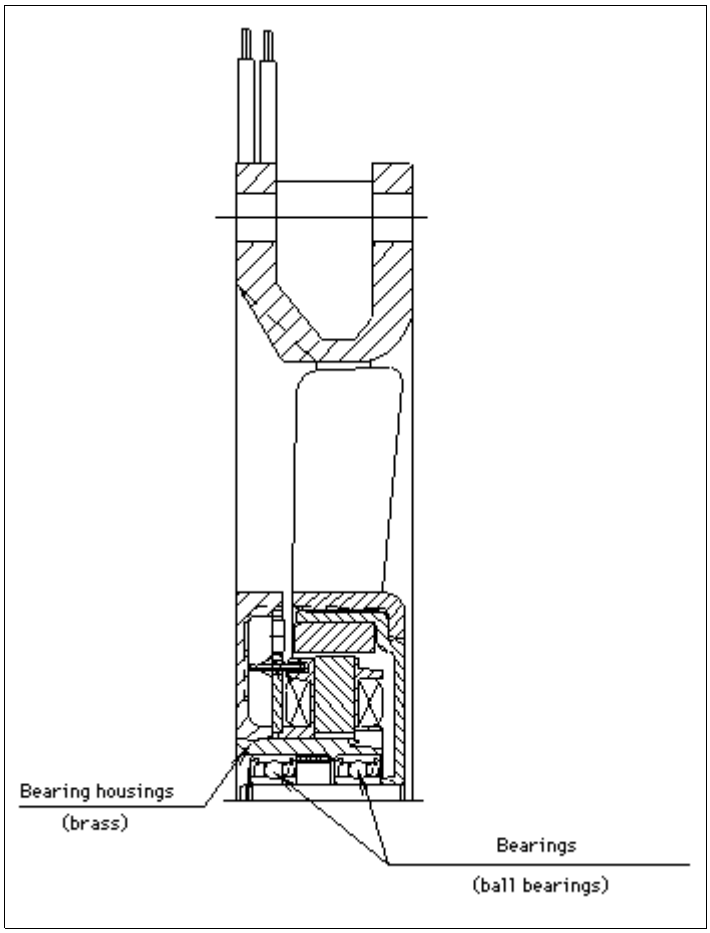

fig. 6 Structural diagram of "PETIT ACE15"