Long Life Fan “San Ace 40L”

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1. Introduction

Fan motors are used for cooling on many different types of equipment, but the typical lifetime of these motors is only four years. Therefore, fan motors for equipment with a long life must be changed regularly. Our company developed the “Long Life Fan” in order to meet customers’ needs for a fan that does not need to be replaced. In the past, comparatively large fans were used for equipment with long life and there were very few long life fans that were smaller than 40 mm square. However, recent developments have made telecommunication equipment smaller size and higher density, and there is an increasing amount of equipment in the 19-inch rack (*1) size with the minimum height of 1U (*2). The 1U size equipment has a height of 44.45 mm, which means that the possible size for a fan motor is limited to 40 mm or smaller.

Our company has developed a new 40 mm square × 28 mm thick, long life fan to meet these applications. This document introduces the features and capabilities of this long life fan.

2. Development Background

Our company has a history of developing long life fans from 60 mm square to 172 mm in diameter. Recently the 40 mm square × 28 mm thick long life fan “San Ace 40L” has been developed for compact equipment that cannot use conventional long life fans.

3. Product Features

Fig. 1 shows a profile of the “San Ace 40L” long life fan.

The features of this product are as follows.

(1) First long life fan with a 40 mm square size that is optimal for 1U racks (44.45 mm height)

(2) 3 speeds lineup for replaceable characteristics with previous models

(3) Pulse sensor and lock sensor options are available

(4) Expected life: 100,000 hours (at 60°C with survival rate of 90%)

Fig. 1: “San Ace 40L” long life fan

New structure and drive circuits have been developed for the “San Ace 40L” long life fan (referred to below as “San Ace 40L”) in order to make it a small, and yet long life, fan.

4. Product Overview

4.1 Dimension

The “San Ace 40L” has the same mounting hole location as the current model, which makes the products highly replaceable. Furthermore, it is made so that the 1U rack chassis will not interfere with the fan body or lead wire. Fig. 2 shows the dimensions of the “San Ace 40L”.

4.2 Characteristics

4.2.1 General characteristics

The rated voltage is 12 VDC, which is required for most 1U equipment. In order to retain compatibility with previous models,

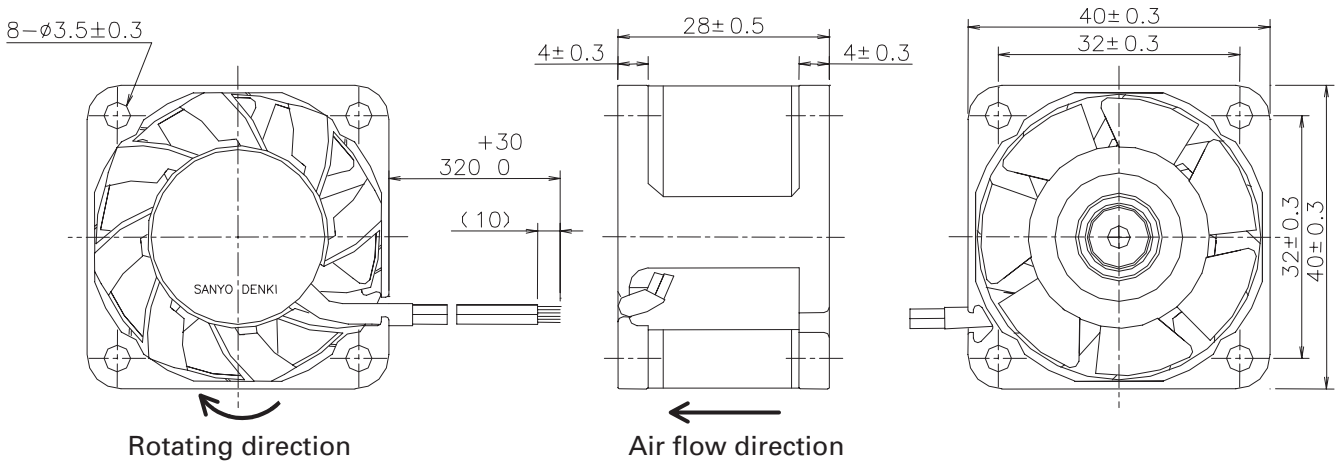

Fig. 2: Dimensions of "San Ace 40L"

Table 1 General characteristics of "San Ace 40L".

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])
9L0412J302	12	10.2 to 13.8	0.31	3.72	11700	0.52	18.4	206	0.827	48
9L0412H302			0.15	1.80	8400	0.37	13.1	106	0.426	40
9L0412M302			0.045	0.54	4000	0.16	5.65	24	0.096	19

there are also three types of rated speed lineup: J speed, H speed, and M speed (listed from fastest to slowest).

4.2.2 Air flow vs. static pressure characteristics.

Fig. 3 shows the air flow versus static pressure characteristics.

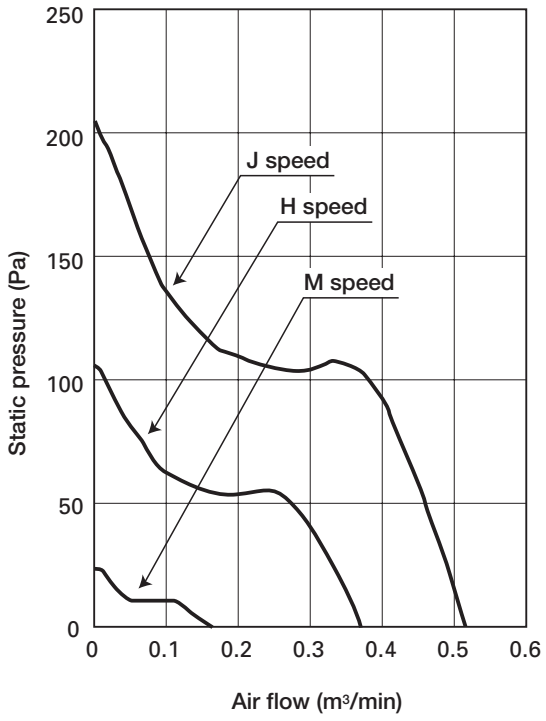

Fig. 3: Air flow vs. static pressure characteristics

4.3 Expected life

The "San Ace 40L" has an expected life of 100,000 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 to Conventional Models

5.1 Long life

Like some other long life fans, the "San Ace 40L" is designed in consideration of following things.

(1) Use of component materials that deteriorate little with time
The materials are carefully selected so that they change characteristic little over time. For example, the magnet material was modified.

(2) Motor drive circuit derating
High reliability is assured with appropriate derating.

(3) Bearing life
Bearings are a vital component in deciding the life of a fan. In order to achieve long life, the design was changed to reduce the load on the bearing and reduce the temperature around the bearings.

5.2 Replaceable characteristics

Multiple speeds were set in the air flow vs. static pressure characteristics to cover various speed characteristics so that "San Ace 40L" could be made easily interchangeable with conventional models.

Fig. 4 compares the characteristics.

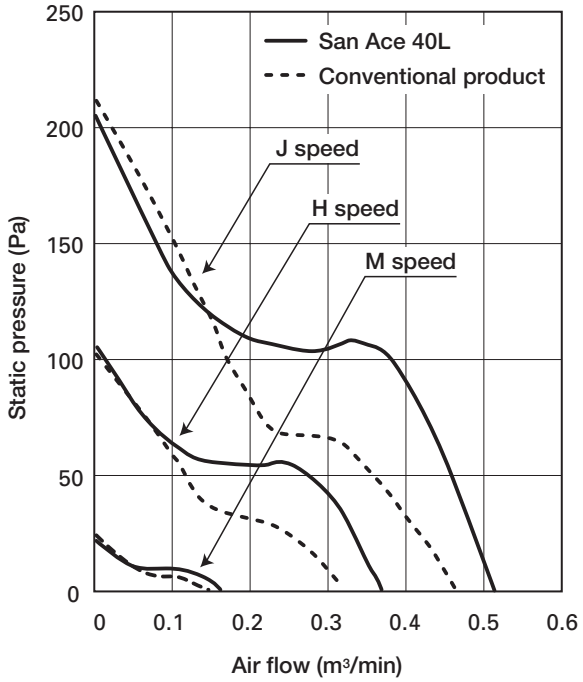

Fig. 4: Comparison of air flow vs. static pressure characteristics

6. Conclusion

This document introduces some of the features and abilities of the newly developed "San Ace 40L" long life fan.

This fan is a result of giving long life characteristics to conventional Sanyo Denki models. When choosing a long life fan, this new model serves as an optimum choice for compact and lightweight equipment or 1U size communication devices.

This product offers reduced power consumption along with reduced size and mass as well as improved environmental impact. Because of its smaller environmental footprint, it has earned our ECO PRODUCTS mark (Fig. 5).

Fig. 5: ECO PRODUCTS symbol

References

(1) Kesatsugu Watanabe, et al: Development of Long Life Fan SANYO DENKI Technical Report, No. 1 (1996-5)

(2) Jirou Watanabe, et al: Low Noise "SAN ACE 120L" SANYO DENKI Technical Report, No. 6 (1998-11)

Footnotes

*1: 19-inch rack is the standard rack for storing computers and telecommunication equipment. The width of equipment stored in the rack is standardized at 19 inches (482.6 mm).

*2: "U" is the unit of the height of equipment that is stored in a 19-inch rack. 1U is equivalent to 1.75 inches (44.45 mm).

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